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A COOPERATIVE STUDY

CHANGES IN DISTRIBUTION OF MANUFACTURING WAGE EARNERS 1899-1939

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CONTENTS

INTRODUCTION.....	Page 1
METHODOLOGY.....	5

Section I

GEOGRAPHIC DISTRIBUTION OF WAGE EARNERS IN ALL MANUFACTURING INDUSTRIES

A. Summary Maps

MAP	1A. Average number of wage earners for the United States, by geographic divisions: 1899 to 1939.....	16
MAP	1B. Population of the United States, by geographic divisions: 1900 to 1940.....	17
MAP	2A. Increase in average number of wage earners of the United States: 1929 to 1939.....	18
MAP	2B. Increase in population of the United States: 1930 to 1940.....	19

B. Summary Charts

CHART	1A. Wage earners in manufacturing industries in the United States, by industrial areas and city groups, based on the 1930 census: 1899-1937.....	20
CHART	1B. Population of the United States, by industrial areas and city groups, based on the 1930 census: 1900-1940.....	21
CHART	2A. Wage earners in manufacturing industries in the United States, by city groups, based on the 1900 census: 1899-1937.....	22
CHART	2B. Population of the United States, by city groups, based on the 1900 census: 1900-1940.....	23

C. Manufacturing Wage Earner and Population Data by Geographic Divisions and States

TABLE	1. Average number of wage earners in manufacturing industries: 1899-1939.....	24
TABLE	2. Percent distribution of wage earners in manufacturing industries: 1899-1939.....	25
TABLE	3. Population: 1900-1940.....	26
TABLE	4. Percent distribution of population: 1900-1940.....	27
TABLE	5. Percent change in manufacturing wage earners, 1899-1939 and 1899-1937, and in population: 1900-1940.....	28
TABLE	6. Percent change in wage earners and in population, 1929-1939, 1919-1929, and 1899-1919.....	29
TABLE	7. Average number of manufacturing wage earners per thousand population: 1899-1939.....	30
TABLE	8. Number and percent of population counted in the labor force: 1910-1940.....	31
TABLE	9. Average number of wage earners, and wage earners per thousand in labor force: 1910-1940.....	34

D. Manufacturing Wage Earner and Population Data by Industrial and Non-Industrial Areas

TABLE	10. Absolute and percent distribution of wage earners and population; wage earners per thousand population, and percent increase: 1899-1937.....	36
TABLE	11A. Wage earners in 1937 and population in 1940, for 58 counties, accounting for one-half of all wage earners in the United States.....	40
TABLE	11B. Wage earners in 1929 and population in 1930, for 54 counties, accounting for one-half of all wage earners in the United States.....	41
TABLE	11C. Wage earners in 1919 and population in 1920, for 48 counties, accounting for one-half of all wage earners in the United States.....	42
TABLE	11D. Wage earners in 1899 and population in 1900, for 46 counties, accounting for one-half of all wage earners in the United States.....	43

E. Manufacturing Wage Earner and Population Data by Size of City Groups

TABLE	12. Average number of wage earners and population, based on the 1930 Decennial Census, for 1937, 1929, 1919, and 1899; and percent change, 1929-1937, 1919-1929, 1899-1919, and 1899-1937.....	44
TABLE	13. Percent distribution of wage earners and population, based on the 1930 Decennial Census: 1899-1937.....	46
TABLE	14. Average number of wage earners and population, based on the 1900 Decennial Census, for 1937, 1929, 1919, and 1899; and percent change, 1929-1937, 1919-1929, 1899-1919, and 1899-1937.....	47
TABLE	15. Percent distribution of wage earners and population, based on the 1900 Decennial Census: 1899-1937.....	49
TABLE	16. Average number of wage earners per thousand population, based on the 1930 Decennial Census: 1899-1937.....	50
TABLE	17. Average number of wage earners per thousand population, based on the 1900 Decennial Census: 1899-1937.....	51

Section II

MANUFACTURING WAGE EARNERS IN 24 INDUSTRIES

A. Aircraft and Aircraft Engines			Page
MAP	3A. Wage earners, by counties, 1929.....		54
MAP	3B. Wage earners, by counties, 1939.....		55
CHART	3. Wage earners, by industrial areas and city groups: 1929-1939.....		56
TABLE	18. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....		57
B. Ammunition			
MAP	4A. Wage earners, by counties, 1929.....		60
MAP	4B. Wage earners, by counties, 1939.....		61
CHART	4. Wage earners, by industrial areas and city groups: 1929-1939.....		62
TABLE	19. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, and 1929; and percent change, 1929-1939 and 1929-1937.....		63
C. Automobile and Automobile Equipment			
MAP	5A. Wage earners, by counties, 1929.....		65
MAP	5B. Wage earners, by counties, 1939.....		66
CHART	5. Wage earners, by industrial areas and city groups: 1929-1939.....		67
TABLE	20. Distribution of wage earners, by geographic divisions, industrial areas and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1937.....		68
D. Blast-Furnace Products			
MAP	6A. Wage earners, by counties, 1929.....		71
MAP	6B. Wage earners, by counties, 1939.....		72
CHART	6. Wage earners, by industrial areas and city groups: 1929-1939.....		73
TABLE	21. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....		74
E. Cars and Equipment—Railroad, Street, and Rapid-Transit			
MAP	7A. Wage earners, by counties, 1929.....		76
MAP	7B. Wage earners, by counties, 1939.....		77
CHART	7. Wage earners, by industrial areas and city groups: 1929-1939.....		78
TABLE	22. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....		79
F. Chemicals, Plastics, and Coal-Tar Products			
MAP	8A. Wage earners, by counties, 1929.....		82
MAP	8B. Wage earners, by counties, 1939.....		83
CHART	8. Wage earners, by industrial areas and city groups: 1929-1939.....		84
TABLE	23. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, and 1929; and percent change, 1929-1939 and 1929-1937.....		85
G. Electrical Machinery			
MAP	9A. Wage earners, by counties, 1929.....		88
MAP	9B. Wage earners, by counties, 1939.....		89
CHART	9. Wage earners, by industrial areas and city groups: 1929-1939.....		90
TABLE	24. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....		91
H. Explosives			
MAP	10A. Wage earners, by counties, 1929.....		94
MAP	10B. Wage earners, by counties, 1939.....		95
CHART	10. Wage earners, by industrial areas and city groups: 1929-1939.....		96
TABLE	25. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, and 1929; and percent change, 1929-1939 and 1929-1937.....		97
I. Firearms			
Map	11A. Wage earners, by counties, 1929.....		99
MAP	11B. Wage earners, by counties, 1939.....		100
CHART	11. Wage earners, by industrial areas and city groups: 1929-1939.....		101
TABLE	26. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....		102
J. Footwear (Except Rubber)			
MAP	12A. Wage earners, by counties, 1929.....		104
MAP	12B. Wage earners, by counties, 1939.....		105
CHART	12. Wage earners, by industrial areas and city groups: 1929-1939.....		106
TABLE	27. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....		107
K. Iron and Steel Forgings			
MAP	13A. Wage earners, by counties, 1929.....		110
MAP	13B. Wage earners, by counties, 1939.....		111
CHART	13. Wage earners, by industrial areas and city groups: 1929-1939.....		112
TABLE	28. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....		113

CONTENTS

V

L. Leather: Tanned, Curried, and Finished

MAP	14A.	Wage earners, by counties, 1929.....	116
MAP	14B.	Wage earners, by counties, 1939.....	117
CHART	14.	Wage earners, by industrial areas and city groups: 1929-1939.....	118
TABLE	29.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	119

M. Locomotives: Railroad, Mining, and Industrial

MAP	15A.	Wage earners, by counties, 1929.....	121
MAP	15B.	Wage earners, by counties, 1939.....	122
CHART	15.	Wage earners, by industrial areas and city groups: 1929-1939.....	123
TABLE	30.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	124

N. Machine Tools and Other Metalworking Machinery

MAP	16A.	Wage earners, by counties, 1929.....	126
MAP	16B.	Wage earners, by counties, 1939.....	127
CHART	16.	Wage earners, by industrial areas and city groups: 1929-1939.....	128
TABLE	31.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	129

O. Miscellaneous Rubber Products

MAP	17A.	Wage earners, by counties, 1929.....	132
MAP	17B.	Wage earners, by counties, 1939.....	133
CHART	17.	Wage earners, by industrial areas and city groups: 1929-1939.....	134
TABLE	32.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	135

P. Motorcycles, Bicycles, and Parts

MAP	18A.	Wage earners, by counties, 1929.....	138
MAP	18B.	Wage earners, by counties, 1939.....	139
CHART	18.	Wage earners, by industrial areas and city groups: 1929-1939.....	140
TABLE	33.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	141

Q. Optical and Ophthalmic Goods

MAP	19A.	Wage earners, by counties, 1929.....	143
MAP	19B.	Wage earners, by counties, 1939.....	144
CHART	19.	Wage earners, by industrial areas and city groups: 1929-1939.....	145
TABLE	34.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	146

R. Paper

MAP	20A.	Wage earners, by counties, 1929.....	148
MAP	20B.	Wage earners, by counties, 1939.....	149
CHART	20.	Wage earners, by industrial areas and city groups: 1929-1939.....	150
TABLE	35.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	151

S. Petroleum Refining

MAP	21A.	Wage earners, by counties, 1929.....	154
MAP	21B.	Wage earners, by counties, 1939.....	155
CHART	21.	Wage earners by industrial areas and city groups: 1929-1939.....	156
TABLE	36.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	157

T. Primary Smelting and Refining—Nonferrous Metals

MAP	22A.	Wage earners, by counties, 1929.....	160
MAP	22B.	Wage earners, by counties, 1939.....	161
CHART	22.	Wage earners, by industrial areas and city groups: 1929-1939.....	162
TABLE	37.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	163

U. Rubber Tires and Inner Tubes

MAP	23A.	Wage earners, by counties, 1929.....	165
MAP	23B.	Wage earners, by counties, 1939.....	166
CHART	23.	Wage earners, by industrial areas and city groups: 1929-1939.....	167
TABLE	38.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	168

V. Ship and Boat Building

MAP	24A.	Wage earners, by counties, 1929.....	170
MAP	24B.	Wage earners, by counties, 1939.....	171
CHART	24.	Wage earners, by industrial areas and city groups: 1929-1939.....	172
TABLE	39.	Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937.....	173

W. Silk and Rayon

	Page
MAP 25A. Wage earners, by counties, 1929	176
MAP 25B. Wage earners, by counties, 1939	177
CHART 25. Wage earners, by industrial areas and city groups: 1929-1939	178
TABLE 40. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937	179

X. Steel Works and Rolling Mills and Steel Castings

MAP 26A. Wage earners, by counties, 1929	182
MAP 26B. Wage earners, by counties, 1939	183
CHART 26. Wage earners, by industrial areas and city groups: 1929-1939	184
TABLE 41. Distribution of wage earners, by geographic divisions, industrial areas, and city groups, for 1939, 1937, 1935, 1933, and 1929; and percent change, 1929-1939 and 1929-1937	185

Section III

Source Material

TABLE 42. Distribution of manufacturing wage earners and population by counties: 1890-1940	190
TABLE 43. Cities listed by population groups, for geographic divisions and States, based on the 1930 census	244
TABLE 44. Cities listed by population groups, for geographic divisions and States, based on the 1900 census	248
TABLE 45. Average number of manufacturing wage earners and population for States, by city groups, based on the 1930 census, for 1937, 1929, 1919, and 1899; and percent change, 1929-1937, 1919-1929, 1899-1919, and 1890-1937	253
TABLE 46. Average number of manufacturing wage earners and population for States, by city groups, based on the 1900 census, for 1937, 1929, 1919, and 1899; and percent change, 1929-1937, 1919-1929, 1899-1919, and 1890-1937	261

PREFACE

Throughout recent depression years there has been widespread interest in the problems arising from the loss of manufacturing wage-earner opportunity in some areas and communities. In an effort to develop accurate data regarding changes in the geographic distribution of manufacturing wage-earner employment this study was undertaken early in 1940.

Shortly after that time our Nation launched the National War Program, and it soon developed that there was considerable need for information of the type obtained under this project. The study was expanded, therefore, and for some time those in charge of this work devoted a major part of their time to supplying data, in the form of maps or charts, to war officials.

The present volume represents a summary of the information developed under the original project and in response to the requests of war officials. It presents data showing changes in distribution of all manufacturing wage earners between 1899-1939, and changes in the distribution of wage earners in 24 important defense industries between 1929-39.

The clerical aid contributed to this study by the Division of Research and Statistics, the Division of Agricultural Products of the National Defense Advisory Commission, and the Bureau of Labor Statistics, Department of Labor, is gratefully acknowledged.

The clerical work involved in this project was performed under the immediate supervision of Jules H. Wayne.

CHANGES IN DISTRIBUTION OF MANUFACTURING WAGE EARNERS: 1899-1939

INTRODUCTION

During the last year, as a result of the rapid expansion of manufacturing facilities which has taken place under the National War Program, there has been a marked renewal of interest in trends in the geographic distribution of American manufacturing activity. In the light of the present importance of the problem of the location of manufacturing activity, and also because of the long-term national significance of this subject, it was deemed desirable to tabulate, analyze, and summarize the statistical data available in the Censuses of Manufactures regarding trends in the location of manufacturing wage-earner employment during the last 40 years.

This study was undertaken by the Bureau of the Census and the Bureau of Agricultural Economics in order to determine the direction and extent of changes in the geographic distribution of manufacturing wage-earner employment and at the same time provide scholars in this field with a body of statistical data which will form the basis for further analytical work. The objectives of this study are: (a) To describe changes in the distribution of "wage earners" engaged in all manufacturing activity in the geographic divisions, States, industrial areas, counties, and cities of the Nation during the past 40 years; (b) to measure changes in the distribution of wage earners in 24 selected manufacturing industries in the geographic divisions, industrial areas, and city groups of the Nation; and (c) to present a corrected body of data regarding the total number of manufacturing wage earners for every county in the country for the years 1899, 1919, 1929, and 1937.

This report, in brief, is a study of the geographic distribution of manufacturing wage earners. To the extent, however, that manufacturing wage-earner employment is one of the better indexes of manufacturing activity, this report also represents a study of the location of manufacturing as such.

In making a study of changes in the geographic distribution of manufacturing as such, some criterion, or group of criteria, must be taken as a basis for measuring changes. The Census of Manufactures offers several such measures among which the more common ones are: (1) Number of establishments; (2) average number of wage earners; (3) value of products; and (4) value added by manufacture. The

number of establishments is not a satisfactory measure of changes in the location of industries because the size of manufacturing plants varies so greatly that no indication of the importance of the changes could be obtained from these figures. Value of products data are not satisfactory for this purpose because they are subject to changes in price levels over a period of time and also because the value of raw materials and semifinished manufactured goods are contained in these figures, thereby making them gross rather than net figures. The value added by manufacture is a better measure than the value of products since it is almost entirely free from duplication. However, it, too, is subject to changes in price levels. The average number of wage earners engaged in manufacturing, therefore, is probably one of the best measures of manufacturing activity as such.

This study is based primarily upon the Censuses of Manufactures, which offer the most comprehensive body of data covering a sufficient period of time to permit a study of trends in the geographic distribution of manufacturing wage-earner employment. Detailed information by counties, however, is not available at as frequent intervals as is desirable. Other limitations of Census of Manufactures' data, such as those due to changes in the scope of the census over the 40 years, changes in the definition of the average number of wage earners, changes in the completeness of coverage in the several censuses, and changes in the land areas included within city and county boundaries; and methods used in estimating the number of wage earners for counties and cities for which data are not published are all explained in detail in the following note on methodology.

The maps, charts, and tables which form the body of this report are grouped into three sections. The material presented in section I deals with changes in the distribution of all manufacturing wage earners between 1899 and 1939. These changes are described for the Nation as a whole, the 9 geographic divisions, the 48 States, the country's 33 industrial areas, and various size of city groups.

In an effort to indicate clearly the importance of changes in the location of manufacturing wage earners these changes are compared wherever possible with changes in the population. In this section, therefore, are found tables showing the distribution not only of manufacturing wage earners, but also of the total population, and tables which indicate changes in the proportion of the population engaged as manufacturing wage earners. From these data it is possible to determine those areas which are the most dependent upon manufacturing activity as a source of livelihood, as well as those which are the least dependent. It will also indicate whether a given area, State, or city is becoming more or less dependent upon manufacturing activity. It is clear that merely to know that manufacturing wage-earner employment is increasing in a given area is not sufficient. It

may be that such a growth is accompanied by a much larger increase in population, thus making the population of the area less dependent upon manufacturing activity, or on the other hand it may be accompanied by a decline in population with manufacturing becoming relatively more important in the area. It should be remembered, of course, that manufacturing activity is only one of a number of sources of livelihood and, therefore, these data do not indicate the proportion of the population of a given area that is gainfully employed.

The classification of cities used in the tables presented in this section are based upon the size of cities reported in the 1930 Decennial Census of Population. Under this latter classification the development of the distribution of manufacturing wage-earner employment among the 1930 city groups in the country is traced back to 1900. An insight is thereby gained into the process through which the present distribution of manufacturing wage-earner employment in our cities emerged.

Such a population classification presents some difficulties, however. Many of the cities existing in 1930 did not exist in 1900 or were either relatively much smaller or much larger at that time than they were in 1930. In other words, the various categories of cities remain fixed in spite of the fact that during the 40-year period covered by this study the size of individual cities was changed. In order to overcome this difficulty, in part, the cities of the country were also classified into size groups on the basis of the 1900 Decennial Census of Population, and data developed on the basis of this classification is presented in this section. The same number of cities was placed in each of the three larger categories as were in these categories on the 1930 basis. The population limits of these categories were thus necessarily different from those fixed in the 1930 classification. The 1900 classification makes it possible to trace forward the industrial growth of the cities of the Nation classified on the basis of their 1900 populations. Through a comparison of the results of these two classifications a more complete picture of changes in the manufacturing wage-earner employment growth of various sizes of cities is obtained.

Section II of the report contains maps, charts, and tables showing changes in the distribution of wage earners in 24 selected manufacturing industries between 1929 and 1939. The distribution of wage earners in each of these industries is given by industrial areas, size of city groups, and geographic divisions. Maps are presented showing the geographic distribution by counties of wage earners in these industries in 1929 and 1939, and charts and tables are presented showing the distribution of wage earners in these industries in the geographic divisions, States, industrial areas, and size of city groups.

The choice of the individual manufacturing industries which were studied in this detailed fashion was somewhat restricted because

changes in industrial classifications used at the various censuses make it impossible to compare many industries, even over the relatively short period of time from 1929 to 1939. The standard industrial classification which was first used in the 1939 Census of Manufactures and which has been adopted by most of the other Government agencies dealing with industrial statistics will probably make for more uniform classification in the future, but important changes such as those which the adoption of the standard classification involved make it difficult to compare 1939 with prior censuses. The 24 industries and industry groups included in this report were chosen from among those important to national defense which were most nearly comparable over the 10-year period. The tabulations for individual industries prior to 1929 are not available and it is, therefore, impossible to study the detailed changes in the distribution of wage earners in individual industries before that year.

The third section of this report contains two sets of tables. The first set of tables presents the absolute figures for all manufacturing wage-earner employment between 1899 and 1939 for the Nation as a whole, by geographic divisions, States, counties, industrial areas, and groups of cities. These source data are presented because they represent the only body of statistical material regarding manufacturing wage-earner employment that has been made comparable over such an extended period of time. Past changes in census coverage have limited considerably the value of the data available to scholars in this field, and this source material is presented in the hope that it will be the basis for future historical analyses of the development of the geographic structure of American manufacturing activity. The second set of tables in the third section of this report consists of lists of the cities included in the various size of city groups based on both the 1930 and the 1900 Decennial Censuses, and the distribution of manufacturing wage earners and population among the 48 States by these city groups between 1899-1937.

This study does not attempt to give the reasons why the distribution of manufacturing wage earners changes as it does, nor the economic and social effects of these movements. The answers to these problems will require detailed studies of individual industries and geographic areas. This report does attempt, however, to give the basic historical information of the changes in the distribution of manufacturing wage earners during the 40 years from 1899 to 1939 and to point out those areas and in some cases those particular industries in which changes have occurred more rapidly, or less rapidly, than for the country as a whole.

The county and city wage-earner data published in this report in many cases do not agree with previously published figures. The reasons for revising published census data was to make those statistics

more comparable over the 40 years covered by this study. The methods used in making these adjustments are explained in the following section.

METHODOLOGY

The data on the location of manufacturing employment presented in this report have been based upon a tabulation of the manufacturing activity reported by the Census of Manufactures for the various geographic divisions, States, counties, and cities of the country during the period 1899 to 1937, and to 1939 where the data were available.

The following were the more important reasons for the selection of the census years 1899, 1919, 1929, and 1937 as the basis for this study. First and foremost, county statistics were unavailable for any other census years between 1899 and 1929, except for the year 1927. Secondly, the years selected were all peaks of manufacturing activity and, therefore, the influence of the business cycle was minimized. Thirdly, since they were all decennial censuses except 1937, the coverage was probably more uniform than it otherwise would be. The 1929, 1937, and 1939 censuses had an additional advantage in that figures for individual industries, by city and county, were available.

It is true, however, that the four census years listed above have the disadvantage of being unevenly spaced and few in number. It would be desirable, for instance, to have information for years between 1899 and 1919. Unfortunately, only State and city data were available for intervening years and, therefore, only the national, divisional, and State figures for 1909 are included in this report.

Four major types of changes in Census of Manufactures data may affect to some extent the results presented in this report.

1. Changes in the scope of the census.
2. Changes in the definition of "Average number of wage earners."
3. Changes in the areas included in city or county boundaries.
4. Changes in the coverage of the several censuses.

The need for estimating the number of wage earners for those counties and cities for which separate information was not published may also affect slightly the accuracy of the results of this report. These estimates are described in detail later in this section.

I. Changes in the Scope of the Census and Accompanying Adjustments

During the 40 years covered by this study several important changes were made in the number and type of enterprises included in the scope of the Census of Manufactures. The most important changes in coverage and the corresponding corrections are as follows:

- (a) Elimination of the hand and neighborhood trades and addition of some timber camps after the census of 1899.

All Censuses of Manufactures from the first, covering the year 1809, through the ninth, covering the year 1899, included the "Hand and neighborhood" industries. By the turn of the century the term manufacturing had come to be used to refer to factory production, however, and the census covering the year 1904 and all subsequent censuses were confined to factory manufactures.

At the same time the "Hand and neighborhood" industries were excluded from the census and other smaller adjustments in the coverage of various industries were made which to some extent offset this shrinkage. Thus, the "Lumber" industry was expanded to cover about 130,000 wage earners employed in timber camps by operators of lumber mills. The "Brass and copper" industry was expanded to cover about 2,800 more wage earners. The net effect of all these adjustments—both the expansion and contraction of census coverage—was a reduction in the original 1899 census figures of 593,380 wage earners. The 1899 figures were made comparable with later years by the 1904 census officials for all States and 522 cities, but no adjustments were made by them in the county data. Estimates of employees in the "Hand, building, and neighborhood trades" to be eliminated and of employees in the "Lumber" and other industries to be added have been made, therefore, for all cities and rural areas outside the 522 cities, on the basis of the total proportion of wage earners they possessed before adjustments.¹

The following examples illustrate this method. On an unrevised basis, Maine had 74,816 wage earners in 1899. Subtracting the figures for those cities for which revisions had been made in 1904, 44,315 wage earners remained. This latter total plus the revised city figures was still 233 larger than 69,914 which was the official revised wage earner State total. The following proportion was therefore set up in order to distribute the 233 to be subtracted from the rest of the State:

$$\frac{44,315}{\text{Unrevised figure for each county, remainder of county, or city in the State}} = \frac{233}{X}$$

In New Hampshire, on the other hand, after the unrevised figures of those cities for which revisions had been made, were subtracted and the revised city figures added back in, the total was 1,128 wage earners short of the official revised State total of 67,646. The same sort of equation as for Maine above was set up, in order to get the

¹ An exception to this rule was made for those cities with over 4,000 population in States in which there were more lumber workers added than hand, building, and neighborhood trades employees subtracted. No lumber workers were assigned to these cities because it was unlikely that any lumber camps were located within the city limits, or if there were, they probably would be counterbalanced by the hand trades in the same cities. The theory upon which this procedure was based is that lumber camps are almost always located outside of cities and that, as stated in vol. VII, p. CCXL of the Twelfth Census, "The hand and building trades are, in great measure, peculiar to cities." The total of these adjustments outside of the 522 cities is insignificant as applied to the "city" tables, both in relation to the State totals for the different groups of cities and the United States totals for the same groups. On the 1930 basis, 129 wage earners were added to Group III, and 448 subtracted, or a net of 319 subtracted. On the 1900 basis, 129 wage earners were added to Group III.

number of wage earners to be added to each unrevised county, remainder of county, or city figure. Glenn E. McLaughlin, in his "Growth of American Manufacturing Areas," using a somewhat different method of allocation of the hand trades, arrives at an 1899 total for the 33 industrial areas of 2,605,100 wage earners as compared with 2,633,979 wage earners secured by the above-mentioned method, a difference of 28,879.

(b) Elimination of the "Automobile repairing" industry in the census of 1919.

The "Automobile repairing" industry, with a total of 55,061 wage earners and \$137,003,306 value added by manufacture in 1919, was not included in the Census of Manufactures after that year. This industry accounted for 0.61 percent of all wage earners reported in the 1919 census and 0.55 percent of total value added by manufacture. In the Mountain Division, 3.27 percent of all wage earners and 2.88 percent of all value added by manufacture reported by manufacturers were in the "Automobile repairing" industry; while in the West North Central and Pacific Divisions, this industry accounted for between 1 and 2 percent of the total industry of each division. In no other geographic division did this industry account for as much as 1 percent of the total for the division. Automobile repairing was of greater importance in a number of individual States, however, accounting for 12.44 percent of all industrial wage earners in South Dakota, 6.78 percent in North Dakota, 5.47 percent in Wyoming, and 4.24 percent in Colorado. So far as individual cities are concerned, Denver, which is included in group II on both the 1930 and 1900 size of city classifications, had a higher proportion of wage earners in this industry than had any other city for which separate data were available. This proportion was 4.5 percent of all Denver's manufacturing employment. The relative importance of this industry in these areas is, of course, accounted for by the fact that they were not highly industrialized.

So far as the distribution of employment in this industry throughout the Nation is concerned, it is distributed somewhat proportionately to population, except that the South has much less than its proportionate share, and the West more.

No adjustment in the 1919 census figures has been made for the "Automobile repairing" industry because of its unimportance in the Nation as a whole in that year, accounting for less than one-half of 1 percent of all manufacturing wage earners in the country, and because data for the number engaged in the industry were available only for States and some large cities, and hence correction would have been difficult.

(c) Omission of establishments with value of products of less than \$5,000 during the census year.

After 1919 establishments with value of products between \$500 and \$5,000 for the census year were eliminated and, beginning with 1921, only those plants whose products were valued at \$5,000 or more during the census year were included in the Census of Manufactures. The one exception to this general rule was that plants that operated only part of the year were included if the value of their products would have exceeded \$5,000 had they operated throughout the entire year. In the census for 1921, when the rule was adopted that no manufacturing establishment with a total value of products of less than \$5,000 would be covered, it was pointed out that for the 1919 census, 78.4 percent of the total establishments, 99.4 percent of the total wage earners, and 99.7 percent of the total value of products were reported by plants whose production was valued at \$5,000 or more. These figures indicate that raising the limit from \$500 to \$5,000 did not materially affect the coverage of the census except in the case of the number of establishments which was reduced materially by eliminating the smaller manufacturing plants from the canvass. Since this study is not based upon the number of establishments, this change in census coverage has little effect on the results presented in this report and consequently no adjustments have been made for this change in coverage.

(d) Elimination of six industries and a part of the turpentine and rosin industry from the Census of Manufactures between 1929 and 1939.

Six industries, "Coffee and spice, roasting and grinding"; "Gas manufacture, illuminating and heating"; "Motion pictures (not including projection in theaters)"; "Peanuts, walnuts and other nuts processed"; and "Railroad repair shops," both steam and electric, were eliminated from the Census of Manufactures during the period 1929 to 1937, while employees in the Turpentine industry working in the woods were eliminated from the Census of Manufactures beginning with 1937. In 1929 these industries, not including "Motion pictures" or "Turpentine woods employees," accounted for 2 percent of all manufacturing establishments in the United States, and 5.3 percent of all wage earners engaged in manufacturing. The West North Central, the South Atlantic, the East South Central, the West South Central, the Mountain, and the Pacific Divisions were affected the most in terms of their respective totals by the elimination of these industries, although in terms of absolute number of wage earners the Middle Atlantic, with 113,599, and the East North Central, with 106,826, were affected most. Eight Southern States were the only ones affected by the elimination of the 30,880 woods workers in the "Turpentine and rosin" industry.

Since the 1929 census was the only one of the five covered which included the "Motion pictures" industry in the United States total, the adjustment for this year was merely a matter of subtracting

"Motion pictures" from each State, county, and city in which located and removing it from the United States total.

More difficult adjustments were involved in the correction of the 1937 and 1939 data. In 1937, for the first time, those persons employed in the woods in the "Turpentine and rosin" industry were treated as not engaged in manufacturing, although information concerning them was collected, tabulated, and published. The 1937 census was adjusted simply by adding the 30,880 woods workers back in, but in 1939 no data for the woods employees were collected. It was, therefore, necessary to estimate the number based upon the ratio existing in 1937 between those employed in the woods and those employed at the still. This adjustment affected the figures for the following Southern States:

Alabama	Mississippi
Florida	North Carolina
Georgia	South Carolina
Louisiana	Texas

A second group of adjustments involved making an estimate for the five industries other than "Motion pictures" which were eliminated from the Census of Manufactures between 1929 and 1937. These five industries, "Coffee and spice, roasting and grinding"; "Gas manufactured, illuminating and heating"; "Peanuts, walnuts and other nuts, processed"; and "Railroad repair shops" (both steam and electric) were added to the published State, county, and city figures for 1937 and 1939 in the same proportion which these industries bore to the total of all manufacturing industry in the particular State, county, or city in 1929. The 1929 census was selected as the estimating base because it was the only year in which an industry breakdown by city and county was available for all of these industries.

For the 1939 census, all estimates were made for States and geographic divisions only, since the county and city statistics were not yet available at the time this report was prepared.

(e) Addition of new industries to the Census of Manufactures since 1900.

All important changes in the scope of the Census of Manufactures have been due to the elimination of industries rather than the addition of new industries. Practically all of the new manufacturing industries which have been added since 1899 have been covered since their infancy and were only made into separate industries when their size warranted a new classification. For instance, the "Automobile manufactures" industry was included in the "Carriages and wagons" industry until 1909, after which date separate statistics were obtained. Other industries, such as Rayon, Plastics, Radios, Phonographs, and so forth, grew into separate industries in a similar manner.

II. Changes in the Definition of Average Number of Wage Earners

"Wage earners are defined as all time and piece workers employed in the plant (including the power plant and maintenance, shipping, warehousing, and other departments). Working foremen and 'gang and straw bosses' are treated as wage earners, but foremen whose duties are primarily supervisory are classed as supervisory employees."²

Beginning with the 1899 census the average number of wage earners has been calculated on the basis of the number of wage earners employed during each month of the year. "The average for the year exceeds somewhat the number that would have been required for the work performed if all had been continuously employed throughout the year, because of the fact that it is impracticable to take into account the extent to which some or all of the wage earners may have been on part-time or for some other reason may not actually have worked on a full-time basis during the entire week covered by the entry for a given month. Moreover, in cases in which a plant was in operation during only a part of a month, the number of wage earners reported for the week selected would be almost certainly above the average for the month. In making comparisons between the figures for the various censuses, the likelihood that the proportion of part-time employment varied from year to year should be taken into account."³

Beginning with the 1939 census, those employees at the factory who were primarily engaged in plant construction and in distribution were called for separately and were not included with wage earners. No estimates as to the effect of this change upon the wage-earner figures have as yet been made, but it is quite possible that distribution employees at the plant were in many instances included as wage earners prior to 1939.

III. Changes in the Land Areas of Cities and Counties Between 1899 and 1937

The Census of Manufactures data for counties and cities have not been adjusted for minor changes in their land areas. The extension of city boundaries has been a common practice throughout the Nation, and changes in the land areas of counties have been quite frequent in certain sections of the country. Where corrections of these changes merely involved adding two or more cities together, as in the case of Omaha and South Omaha, this was done. Changes in land areas have, however, tended to improve the position of cities, since these cities tend to expand their limits as the surrounding countryside becomes more highly populated or more industrialized. As the cities expand their limits, the remainder of the county naturally contracts.

² Biennial Census of Manufactures, 1937, part I, p. 7, par. 4.

³ Biennial Census of Manufactures, 1937, part I, p. 7, par. 8.

Thus, although the land areas of City Groups I, II, and III, on both bases, are supposedly constant throughout the period, they are undoubtedly much larger at the end than at the beginning of the period. It is highly significant, therefore, that in spite of Group IV's shrinkage in land area, it is the fastest growing group industrially on the 1900 basis and second to Group III on the 1930 basis.

IV. Changes in Completeness and Accuracy of the Canvass of the Census of Manufactures

No test of the completeness of Census of Manufactures data as a whole has ever been made, but it is quite apparent that censuses taken by field canvass are more complete than those covered by mail. The difference in the completeness of coverage of the two methods is quite marked in the Clothing industries where plants are located in lofts and shift their sites readily. Complete field enumeration was made for the censuses of 1919, 1929, and again in 1939. In 1899 and 1937 a combination of a field and mail canvass was used. In general, there is no reason to believe that under-enumeration in one area or census and more complete enumeration in another area or census has had any serious effect upon the results obtained.

CITY ESTIMATES

Aside from the major adjustments already mentioned, certain other estimates were necessary in tabulating the "City tables" because data for some cities in some years were lacking. This lack of completeness in published data was a result either of the necessity of preventing disclosures of individual operations or of the fact that the city's population did not come up to a prescribed minimum. In either case, the estimate was based on the ratio existing between the city's and county's wage earners in the nearest comparable year or years, whenever this ratio was available and consistent with population trends.

A few examples may serve to illustrate this method. White Plains, N. Y., was estimated at 175 wage earners in 1899, based on the 1919 White Plains to Westchester County wage-earner ratio of 0.012 applied against the 1899 county wage-earner figure of 14,586.

The 1929 figure (X) for Roanoke was estimated by averaging 1919 and 1937 in the following way:

$$\begin{array}{l} \text{Roanoke city wage earners for 1919 and} \\ \text{1937 (19,120)} \qquad \qquad \qquad \text{X} \\ \hline \text{Roanoke County and city wage earners} = \text{Roanoke County and city wage earners} \\ \text{for 1919 and 1937 (20,985)} \qquad \qquad \text{for 1929 (12,237)} \end{array}$$

X=11,149 (wage-earner estimate for Roanoke city in 1929)

In some cases, however, when wage earners secured by the use of a wage-earner ratio seemed out of line with the city's population, or when the wage-earner ratio could be secured based only on a distant

census year, then a population ratio was used. For example, the only wage-earner ratio available for estimating Aliquippa, Pa., for 1899 and 1919 was the 1929 city to county wage-earner ratio. If this were used, it would have given a wage-earner figure for both years higher than the entire population of the city. Consequently, the 1900 and 1920 city to county population ratios were applied against the 1899 and 1919 county wage-earner figures, thus obtaining 80 wage earners for Aliquippa in 1899 and 636 wage earners in 1919.

A third important set of cases involved the use of both wage earners and population ratios, since it was felt that the use of either one exclusively would not give as nearly accurate a figure. For example, in estimating Garfield, N. J., for 1899, it was found that the population ratio of the city to the county had more than doubled between 1899 and 1919, so that the wage-earner ratio for 1919 alone would give much too high a figure. On the other hand, the wage-earner ratio in 1919 was two and one-half times the population ratio, so that it was quite evident that if the 1900 population ratio were used it would give much too low a figure. The following proportion was set up, therefore, in order to get the desired 1899 ratio of the city to the county's wage earners (X) to be applied against Bergen County wage earners in 1899:

$$\frac{\text{1919 city to county population ratio}}{\text{1899 city to county population ratio}} = \frac{\text{1919 city to county wage-earner ratio}}{X}$$

$$\frac{0.090}{0.040} = \frac{0.226}{X} \quad X = 0.1004$$

0.1004 times 4,646 (Bergen County's wage earners) = 466 (wage-earner estimate for Garfield).

The importance or lack of importance of the above estimates can be judged from the following table which gives the total of these estimates for the United States for the various years, and the percent these estimates are of their respective categories. It should be understood in evaluating these estimates that the possible margin of error in many cases is rather small since the upper limit is set by the county total and the lower limit by a certain minimum proportion of the population.

AVERAGE NUMBER OF WAGE EARNERS AND PERCENT OF CITY ESTIMATES BY CITY GROUPS
[1930 basis]

ITEM	1937	1929	1919	1899
United States total.....	9,069,238	8,827,960	9,096,372	4,712,763
Total of estimates.....		15,670	28,961	14,504
Percent estimates are of United States total.....		0.18	0.32	0.31
United States total in Group II.....	1,611,249	1,669,933	1,784,233	844,940
Total estimates in Group II.....			14,514	253
Percent estimates are of Group II total.....			0.81	0.03
United States total in Group III.....	1,635,769	1,540,166	1,563,277	719,790
Total estimates in Group III.....		15,670	15,101	14,251
Percent estimates are of Group III total.....		1.02	0.97	1.98

AVERAGE NUMBER OF WAGE EARNERS AND PERCENT OF CITY ESTIMATES BY
CITY GROUPS

[1900 basis]

ITEM	1937	1929	1919	1899
United States total.....	9,069,238	8,827,960	9,096,372	4,712,763
Total of estimates.....	1,129	21,208	16,977	
Percent estimates are of United States total.....	0.01	0.24	0.19	
United States total in Group II.....	1,628,168	1,725,758	1,876,129	934,251
Total estimates in Group II.....		4,304		
Percent estimates are of Group II total.....		0.25		
United States total in Group III.....	1,396,067	1,364,390	1,402,795	715,258
Total estimates in Group III.....	1,129	16,904	16,977	
Percent estimates are of Group III total.....	0.08	1.24	1.21	

It can be seen, therefore, that so far as the United States table is concerned, these estimates are relatively unimportant. This is not true, however, so far as the individual States or geographic divisions are concerned as can be seen from the following subdivisions of these estimates by divisions and States:

AVERAGE NUMBER OF WAGE EARNERS AND PERCENT OF CITY ESTIMATES BY
CITY GROUPS WITHIN THE NINE GEOGRAPHIC DIVISIONS

DIVISION	Year	Number wage earners estimated	City groups estimated	Percent of divisional group total
1930 BASIS				
Middle Atlantic.....	1899	4,583	III	2.29
	1919	636	III	0.16
East North Central.....	1899	6,166	III	3.46
	1919	14,514	II	3.31
	1919	512	III	0.10
West North Central.....	1919	124	III	0.20
	1929	4,521	III	7.66
South Atlantic.....	1899	26	II	0.05
	1899	346	III	0.54
	1919	12,559	III	9.21
	1929	11,149	III	7.23
West South Central.....	1899	141	II	0.52
	1899	1,362	III	15.36
	1919	616	III	3.09
Mountain.....	1899	698	III	12.74
Pacific.....	1899	86	II	0.50
	1899	1,096	III	9.49
	1919	654	III	1.99
1900 BASIS				
New England.....	1929	3,295	III	1.39
Middle Atlantic.....	1919	2,091	III	0.59
East North Central.....	1919	2,385	III	0.57
	1929	787	III	0.18
	1937	573	III	0.13
West North Central.....	1919	358	III	0.54
	1929	4,304	II	3.07
	1929	519	III	0.78
	1937	425	III	0.64
South Atlantic.....	1919	11,953	III	8.61
	1929	11,149	III	8.16
Mountain.....	1919	190	III	2.03
	1929	1,154	III	16.39
	1937	131	III	1.93

AVERAGE NUMBER OF WAGE EARNERS AND PERCENT OF CITY ESTIMATES BY
CITY GROUPS WITHIN THE STATES

[1930 basis]

DIVISION AND STATE	Year	Number of wage earners estimated	City group estimated	Percent of State group total
MIDDLE ATLANTIC:				
New York.....	1899	175	III	0.24
New Jersey.....	1899	4,328	III	11.35
Pennsylvania.....	1899	80	III	0.09
Pennsylvania.....	1919	636	III	0.38
EAST NORTH CENTRAL:				
Ohio.....	1899	467	III	1.25
Illinois.....	1899	5,534	III	10.50
Michigan.....	1899	165	III	0.61
Michigan.....	1919	512	III	0.36
Indiana.....	1919	14,514	II	13.42
WEST NORTH CENTRAL:				
Missouri.....	1919	124	III	1.15
Missouri.....	1929	4,521	III	46.74
SOUTH ATLANTIC:				
West Virginia.....	1899	61	III	0.62
Florida.....	1899	26	II	0.50
Florida.....	1899	285	III	33.02
Florida.....	1919	606	III	11.21
Virginia.....	1919	11,953	III	38.18
Virginia.....	1929	11,149	III	36.18
WEST SOUTH CENTRAL:				
Arkansas.....	1899	392	III	15.90
Arkansas.....	1919	576	III	8.30
Louisiana.....	1899	419	III	28.23
Oklahoma.....	1899	141	II	39.06
Oklahoma.....	1899	163	III	100.00
Texas.....	1899	388	III	8.16
Texas.....	1919	40	III	0.51
MOUNTAIN:				
Arizona.....	1899	698	III	100.00
PACIFIC:				
California.....	1899	86	II	3.05
California.....	1899	1,096	III	12.50
California.....	1919	654	III	1.62

AVERAGE NUMBER OF WAGE EARNERS AND PERCENT OF CITY ESTIMATES BY
CITY GROUPS WITHIN THE STATES

[1900 basis]

DIVISION AND STATE	Year	Number of wage earners estimated	City group estimated	Percent of State group total
NEW ENGLAND:				
Rhode Island.....	1929	3,295	III	6.41
MIDDLE ATLANTIC:				
Pennsylvania.....	1919	2,091	III	1.29
EAST NORTH CENTRAL:				
Michigan.....	1919	2,385	III	3.10
Michigan.....	1929	787	III	0.85
Michigan.....	1937	573	III	0.56
WEST NORTH CENTRAL:				
Minnesota.....	1919	358	III	12.38
Minnesota.....	1929	519	III	20.85
Minnesota.....	1937	425	III	16.04
Missouri.....	1929	4,304	II	12.59
SOUTH ATLANTIC:				
Virginia.....	1919	11,953	III	29.05
Virginia.....	1929	11,149	III	32.01
MOUNTAIN:				
Colorado.....	1919	190	III	6.88
Colorado.....	1929	81	III	4.04
Colorado.....	1937	131	III	7.76
Wyoming.....	1929	1,073	III	100.00